Dislocation of the long head of the biceps tendon with intact subscapularis and supraspinatus tendons

M. Lucas Gambill, DO, Timothy S. Mologne, MD, and Matthew T. Provencher, MD, San Diego, CA

A large body of evidence supports the fact that subluxation and dislocation of the long head of the biceps tendon are relatively common findings associated with rotator cuff pathology. Dislocation of the long head of the biceps is often linked to chronic degenerative changes seen with impingement syndrome and tears in the rotator cuff, especially the subscapularis tendon. One report states that medial dislocation of the long head of the biceps tendon can occur in up to 16% of rotator cuff tears. Other authors have reported isolated dislocations of the biceps tendon without the presence of rotator cuff tears. However, to our knowledge, there have been no reports of a medially dislocated long head of the biceps tendon with intact subscapularis, supraspinatus, and infraspinatus tendons. We report on a patient with posttraumatic posterior shoulder instability with a medial dislocation of the long head of the biceps tendon over an intact subscapularis tendon without evidence of a torn rotator cuff. This injury is unique in that the subscapularis tendon is not torn, implying an injury to the tissues of the rotator interval, likely the coracohumeral and superior glenohumeral ligaments.

CASE REPORT

A 29-year-old right hand–dominant man presented with a 2-year history of left shoulder pain and instability. He reported a traumatic load to the joint sustained when a teletype machine fell down a stairwell onto his left shoulder, which resulted in forced adduction and internal rotation of the limb as he attempted to fend off the heavy device. After the injury, he complained of persistent pain, popping of the joint, and frequent nocturnal paresthesias. Despite a trial of conservative treatment, which included physical therapy and nonsteroidal antiinflammatory agents, his condition did not improve.

On initial examination, the patient was found to have no obvious atrophy or deformity of the shoulder joint. The range of motion of the shoulder was normal and symmetric to the unaffected shoulder. The patient was found to have a positive posterior apprehension test, a positive Speed’s test, and a positive O’Brien test. In the lateral decubitus position, he was found to have grade IV posterior translation, with the humeral head easily subluxated over the glenoid rim, requiring a reduction maneuver to reduce it. There was normal anterior translation. There was marked tenderness in the area of the bicipital groove.

Initial radiographic findings showed a small compression defect in the anterior humeral head. A magnetic resonance arthrogram with gadolinium of the left shoulder demonstrated a posterior labral tear (Figure 1), a dislocation of the long head of the biceps tendon over an intact subscapularis tendon, and a normal rotator cuff (Figure 2). An examination with the patient under anesthesia confirmed the grade IV posterior translation of the humeral head. Anterior translation was normal.

Diagnostic arthroscopy revealed the long head of the biceps tendon to have a normal contour, but the tendon was displaced medially and caudally from the normal path in the rotator interval. The posterior labrum was torn and avulsed from the glenoid (Figure 3). The posteroinferior recess was patulous. The rotator cuff was intact and normal in appearance (Figure 4). There was tearing of the superior glenohumeral ligament in the rotator interval. The leading edge of the subscapularis tendon was normal.

After diagnostic arthroscopy, an arthroscopic posterior capsulolabral repair was performed with polyester suture and 3-mm bioabsorbable suture anchors (BioFastak; Arthrex, Naples, FL). At the conclusion of the arthroscopic portion of the case, a tenotomy of the biceps tendon was performed with an electrocautery device. An anterior mini-deltoidpectoral incision was then made to expose the rotator interval and bicipital groove. It was noted that the long head of the biceps tendon was dislocated medially, lying anterior to the subscapularis tendon (Figure 5). After the biceps tendon was retracted out of the rotator interval, a biceps tenodesis was performed with a bioabsorbable interference screw (BioTenodesis Screw; Arthrex). The rotator interval was advanced laterally and closed with nonabsorbable sutures.

Postoperatively, the patient used an UltraSling (dj Orthopedics, Inc, Vista, CA) in neutral rotation for 6 weeks. Therapy was initiated for progressive range of motion and strengthening after immobilization. At 2
years postoperatively, he had no pain or complaints of instability or limited shoulder function. He had a full range of motion and normal posterior stability. The contour of his anterior brachium and biceps was symmetric to his contralateral limb. He has subsequently resumed all prior activities, which included weightlifting, swimming, baseball, and woodworking.

DISCUSSION
Isolated dislocation of the long head of the biceps is a rare entity. In most cases, dislocation of the biceps tendon out of the bicipital groove is usually associated with tears of the subscapularis tendon or massive rotator cuff tears (or both).\(^1\)\(^1\)\(^\text{13}\) There are case reports of isolated dislocations of the biceps tendon\(^3\)\(^4\), however, these studies were published before the advent of arthroscopy and magnetic resonance imaging. To our knowledge, this is the first case of a dislocated biceps tendon associated with posterior instability of the shoulder.

The capsuloligamentous structures of the rotator interval function, in part, to retain the long head of the biceps within the bicipital groove. The coracohumeral and superior glenohumeral ligaments are believed to be the two most important structures of the rotator interval responsible for preventing displacement of the long head of the biceps tendon out of the groove.\(^8\)\(^10\)\(^\text{13}\) They function to form a sling around the tendon, preventing medial dislocation over the lesser tuberosity. The superior glenohumeral ligament assists in preventing posterior translation of the humeral head when the arm is adducted.\(^5\) Displacement of the tendon out of its groove is also associated with rotator cuff tears. In most cases, complete dislocation of the biceps tendon is nearly always associated with a tear in the subscapularis tendon.\(^9\) In fact, Warren\(^12\) states that the entity of a subluxating biceps tendon in the absence of damage to either the lesser tuberosity or subscapularis tendon is “a diagnosis we are unable to reliably arrive at.” Similarly, Walch et al\(^11\) report, “We have never seen a subluxation or dislocation with the three tendons (subscapularis, supraspinatus, and infraspinatus) intact.”
We believe that the traumatic injury our patient sustained led to disruption of the rotator interval, allowing the long head of the biceps tendon to dislocate medially across the lesser tuberosity and over an intact subscapularis. Some authors support the circle concept of glenohumeral instability (ie, that translation of the humeral head can occur with injury to the capsule on one side, but frank dislocation of the joint requires an insult to both sides). Recent biomechanical studies report that the subscapularis is the most important tendon in resisting humeral head subluxation. In addition, the coracohumeral and inferior glenohumeral ligaments, two important structures of the rotator interval, also make significant contributions to stabilizing the shoulder when the humerus is in neutral and internal rotation, respectively. Our patient is believed to have had posterior shoulder instability as a result of a traumatic injury to the glenoid labrum and rotator interval, specifically the coracohumeral and superior glenohumeral ligaments. This injury subsequently allowed for medial displacement of the long head of the biceps tendon over an intact subscapularis. Pathology of the long head of the biceps tendon has been recognized to play a role in the development of shoulder pain and dysfunction. We have shown a unique case of a dislocated long head of the biceps tendon over intact subscapularis and supraspinatus tendons in a patient with traumatic posterior instability of the shoulder. A dislocation of the long head of the biceps most often involves a tear of the subscapularis (at a minimum, the upper portion of the subscapularis) or supraspinatus tendons (or both). This case illustrates a dislocation of the long head of the biceps tendon probably resulting from injury to the coracohumeral and superior glenohumeral ligaments and other soft-tissue structures contained within the rotator interval sustained after traumatic posterior shoulder instability. It should serve to emphasize the importance of the tissues in the rotator interval as restraints to biceps subluxation, as well as to highlight the potential injury to the rotator interval in patients with posterior shoulder instability.

REFERENCES